ANNUAL REPORT 2011-2012

CENTRE DE RECHERCHE INFORMATIQUE DE MONTRÉAL

CRIM

Profile

MISSION

CRIM is an IT applied research centre dedicated to the development and transfer of cutting-edge technology and know-how to Québec's leading businesses and organizations, hence increasing their productivity and competitiveness, both locally and globally.

VALUES

- → INNOVATION at the heart of our mission, it drives everything we do.
- → CREATIVITY our ability to imagine what does not yet exist and impels each of us to excel and innovate.
- → COLLABORATION is embedded in our organizational culture and business practices.
- → INTEGRITY resides in the trust our clients and partners place in us as a neutral third party and is the foundation of our professionalism.
- → TRANSPARENCY fosters trust, fairness and promotes open and effective communication.

Message from CRIM's Chair of the Board of Directors and President and Chief Executive Officer

A YEAR OF MAJOR PROJECTS

Now more than ever before, CRIM is fulfilling its expert and independent third-party role through active involvement in most of Québec's strategic IT projects and initiatives. The 2011–2012 period marked a milestone for CRIM in terms of its strategic positioning and economic returns.

In 2011-2012, CRIM worked actively to ensure greater recognition and understanding of its role within the IT ecosystem. By virtue of its vast expertise and its transfer and liaison mission, CRIM has become a natural partner in the development and deployment of Québec's large-scale IT projects. Because of its neutrality, CRIM was able to set up Le Guichet Nord, an important consortium in Québec's immense economic, social and environmental Plan Nord project. CRIM is also contributing to the development of an Open Innovation Maturity Model (OOMM) for Québec's IT sector, in partnership with numerous businesses, research centres, liaison and transfer centres (LTCs) and universities. Such programs, along with the development of a Quebec Centre of Excellence in Web Semantics, the NECSIS project, the "Écolo TIC" project, "My first digital health line" project and the "Québec Health Record (QHR)", are all key IT initiatives involving CRIM's participation. CRIM is indeed now better equipped than ever before to help local business boost their performance. Corporate financial assistance programs have been optimized. They are now more flexible and benefit, for example, from increased eligibility to programs offered by the Ministère du Développement économique, de l'Innovation et de l'Exportation. CRIM will benefit from new communication platforms (Web site, social media, collaborative watch, etc.) they are scheduled for a launch in late 2012. In the future, CRIM will use leading-edge tools to disseminate its technologies, deliver service and fulfill its transfer and liaison centre missions optimally.

Fiscal 2011-2012 was also marked by the optimization of internal management through investment in key sectors and expansion of our partnership network. These events included the appointment of Nathalie Gosselin as General manager of our Transfer and Training Centre. Ms. Gosselin remains General manager of CRIM's Testing and Interoperability Centre. Her service in both roles has already yielded results. This additional leverage and synergy across CRIM's three sectors of activity have generated proliferation of inter-team projects, forging of new key partnerships and strengthening of existing ones. These include CRIM's relationships with TechnoConseil, its main partner for providing training programs in Québec; Versalys and Kéréon, in security; and Hewlett Packard (Canada), MGA, Ideabytes, Shunra and Caristix, in testing. Furthermore, Maxime-R. Clerk who was hired in 2011, as Director, Communications and Marketing, is doing an exceptional job of building on CRIM's reputation for expertise throughout Québec. At the same time, the performance of the Applied Research Centre (ARC) teams has been outstanding, with two patents filed and participation to two precompetitive industrial research projects in partnership, as well as partnerships with multiple Canadian and foreign research centres, 26 scientific publications and 146 growth-generating projects addressing the needs of local businesses.

In closing, we would like to express special thanks to our colleagues on the Board and the Management Committee, to all CRIM employees and to our members and partners for having made your institution an economic stimulus and a vital force in Québec's IT sector. Thanks to you, CRIM is in an enviable position to enjoy even greater success in 2012–2013.

MARIE LAPALME
Chair of the Board of Directors

DANIEL BLANCHE
President and Chief Executive Officer

CRIM's Board of Directors

The Power to Move Forward!

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Director, Technology business development → Hydro-Québec's Research Institute

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Director, Strategic Development and Institutional Relations, Ubisoft Campus
→ Ubisoft Divertissements

22 **Mr. CLAUDE VIGEANT**
President → OKIOK

23 **Ms. FRÉDÉRIQUE-MYRIAM VILLEMEURE (Observer)**
Adjointe exécutive, Direction de l'innovation et du transfert
→ Ministère du développement économique, de l'innovation et de l'exportation (MDEIE)

MANAGEMENT COMMITTEE

1 **Mr. DANIEL BLANCHE**
President and CEO

2 **Mr. MAXIME-R. CLERK**
Director, Communications and Marketing

3 **Ms. NATHALIE GOSSELIN**
General Manager
Training and Transfer Centre , Testing and Interoperability Centre

4 **Mr. JACQUES OUELLET**
Senior Vice-President, R&D and Commercialization
Applied Research Centre

5 **Ms. FRANCINE RIÉL**
Assistant to the President & CEO

6 **Mr. CLAUDE ROBITAILLE**
Director, Human and Material Resources

7 **Ms. SUZANNE TREMBLAY**
Director, Finance Department and Information Systems

Joint message from the Senior Vice-President, R&D and Commercialization, Applied Research Centre and Directors of the research teams

CHALLENGES TO OVERCOME

CRIM continues to evolve, while ensuring that its members maintain their leading edge.

Numerous organization have been drawing on CRIM's expertise for years, including some, like the **National Film Board** and **Siemens**, with relationships that date back more than a decade. CRIM must stay on the leading edge to ensure strong support to its partners.

To remain as efficient, CRIM must constantly renew itself and make sure it stays on the leading edge in terms of service offer and client support.

Through its technological watch and innovation activities, CRIM helps organizations successfully meet new challenges posed by massive quantities and effective use of data.

Over the past year, for example, CRIM inked a major four-year research agreement with **VoiceTrust** in voice biometrics and speech recognition.

Doing more, faster and at lower cost are the hurdles CRIM seeks to leap on behalf of its partners.

JACQUES OUELLET
Senior Vice-President, R&D and Commercialization, Applied Research Centre

DYNAMIC RESEARCH TEAMS!

Speech Recognition

This year was marked by an increasing number of international partnerships. CRIM's annual participation in the Bosaris and Kaldi workshops was accompanied by our contributions to organization of ISSPA 2012 in Montréal, in July. CRIM also achieved excellent results for its content-based copy detection system in TECVID (TREC Video Retrieval) international evaluation and in ETAPE French TV broadcast transcription evaluation. These efforts generated commercial and scientific payback, including a long-term agreement on speaker verification research and knowledge transfer, signed with **VoiceTrust** in January 2012.

Vision and Imaging

Our team had its best year in terms of financial success and project magnitude since its creation in 1999. We grew to 12 members and expanded our sectors of expertise to include computer graphics and interactive applications.

Development and Internet Technologies

Two sectors were particularly productive this year. Work on semantics, including several projects for automating and enhancing processing chains, have proved to be of great value to organizations. The team also responded to a growing demand for HTML5 and advanced Javascript by partnering with businesses in providing expertise, best practices and developmental assistance.

Distributed Systems Analysis

The team pursued its partnerships with **Siemens**, **Bombardier Transport**, **GM** and **IBM** in the NECSIS (Network on Engineering Complex Software Intensive Systems for Automotive Systems) project. Most of its work is related to various aspects of test automation. Alexandre Petrenko is a co-author (with Villa, T., Yevtushenko, N., Brayton, R.K., Mishchenko, A., and Sangiovanni-Vincentelli A.) of a research monograph, *The Unknown Component Problem, Theory and Applications*, published this year by Springer.

GILLES BOULIANNE
Team Director, Speech Recognition

SACHA LEPRÊTRE
Team Director, Development and Internet Technologies

LANGIS GAGNON, Ph.D.
Lead Researcher and Team Director, Vision and Imaging

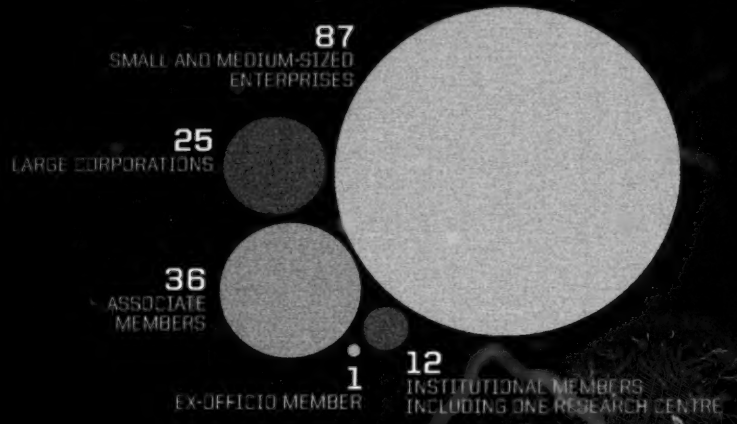
ALEXANDRE PETRENKO, Ph.D.
Lead Researcher and Team Director, Distributed Systems Analysis

CRIM's

Facts and Figures

NETWORK

161 MEMBERS



68 REGULAR EMPLOYEES

CONTRIBUTIONS AND PARTICIPATIONS

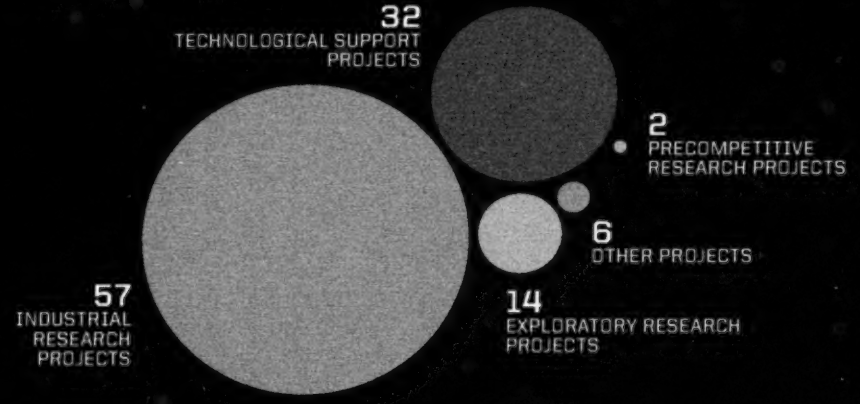
29 Service agreements, crossed memberships, course offerings, etc.

24 Staff participations as conference speakers or panellists

24 Staff contributions as committee members, guest professors, etc.

RESEARCH AND DEVELOPMENT

111 PROJECTS



4 Teams

32 Lead researchers, researchers, advisors, research agents and postdoctoral fellows

16 Scholars and interns

26 Publications

TESTS AND INTEROPERABILITY

35 PROJECTS

TRAINING AND KNOWLEDGE TRANSFER

1 339 Trained individuals

55 High caliber training experts

203 Course titles

166 Training courses offered

61 New courses offered*

Message from the General Manager, Training and Transfer Centre and Testing and Interoperability Centre

PROMISING DEVELOPMENTS

TESTING AND INTEROPERABILITY CENTRE (TIC)

The TIC's neutrality and unique expertise are crucial qualities that our clients increasingly require. CRIM provides a major boost to local firms engaged in Canadian and international testing and interoperability projects, as well as with certification, audit and assessment procedures.

Excellence Thruway

The TIC team has been enhanced this year by the addition of Vincent Siveton as Strategic Advisor (internal transfer from the Applied Research Centre to the TIC).

Following upgrades and the acquisition of a new server, our virtual collaborative laboratory AgileLabs provided more effective responses to increasing client demands for test services. Partnerships were also concluded with such firms as **Hewlett Packard Software**, **MGA-QA** (for Replay, a unique made-in-Québec testing application and **Ideabytes**, with teams in Canada and India) to expand the SaaS services and resources dispensed by AgileLabs. The TIC is now working even more closely with CRIM's partners in the Training and Transfer Centre (TTC). Several joint projects have already returned good results.

Now more than ever, the TIC is geared to become Québec's reference in terms of testing and interoperability. It will be better positioned than before to assist firms seeking to overcome performance issues in developing and integrating software and risk-management technologies under pressure.

TRAINING AND TRANSFER CENTRE (TTC)

The TTC changeover process that began with Nathalie Gosselin's arrival in March 2012 has not only gone well, but proceeded more rapidly than expected. As of June 2012 the TTC had a major boost with the arrival of Catherine Viens, our new program manager. The first months of the transition focused on optimizing the Centre's internal and operational processes. TTC partners have noticed a significant improvement in services offered and responded favourably to this progress.

Furthermore, the Centre initiated sustained growth among its training programs at the close of the fiscal period. With positive preliminary results of the transition process, we will continue to implement the TTC's vision and development strategy.

Strong Partnerships

In its optimization of TTC's business process, CRIM continues to build on existing relationships as it reinforces new strategic partnerships. A co-venture with **TechnoConseil** in launching CRIM-CampusTC, for example, will solidify our presence in Québec. A partnership with **Versalys** and **Kéréon** will permit joint state-of-the-art security training programs. A plan to spotlight our partners is underway, with the support of CRIM's Communication team.

TTC's growth strategy is also being supported with the collaboration of its partners. This alliance enables TTC to deliver a unique product, while generating substantial revenues.

Fresh Approach

The TTC has adopted a new approach built around the specific needs of different client types. It is maintaining state-of-the-art training sessions for IT professionals and increasing its offerings to target organizational leaders. The TTC's ongoing leading-edge programs will now be offered to all members of the IT community and enable CRIM to meet the full range of such training needs by Québec organizations.

NATHALIE GOSSELIN
General Manager, Training and Transfer Centre and Testing and Interoperability Centre

Recognized Leadership

PRESTIGIOUS PRIZE AWARDED TO RESEARCHER ALEXANDRE PETRENKO

Director of the Distributed Systems Analysis Team and Lead Researcher at CRIM, Alexandre Petrenko participated in the IEEE 5th International Conference on Software Testing, Verification and Validation in Montréal, from April 17 to 21, 2012. This meeting brought together 250 participants and received 176 submissions from 31 nations, 48 of which were selected for publication. These include a contribution co-authored by Alexandre that received the prestigious Best Paper Award. He also made a presentation as a keynote speaker at the Advances in Model-Based Testing Workshop.

EXCELLENCE TROPHY AT THE 2012 OCTAS COMPETITION

Revenu Québec, in conjunction with CRIM, received the Excellence Trophy at the 2012 OCTAS Competition presented by the Réseau Action TI industrial alliance for its mandatory restaurant billing (RESTO – Facturation obligatoire) project in the restaurant sector. Revenu Québec also received an OCTAS award for this project in the "Innovation—More than 250 Employees" category. CRIM served as a specialist for the security component of the sales recording module (SRM).

Landmark Achievements

APPLIED RESEARCH CENTRE

CRIM's research teams have been very busy over the 2011-2012 period!
Descriptions of the main projects on which our researchers focused their efforts follow.

→ Speech Recognition

ETAPE

Transcription and diarization of audio recordings

The ETAPE project assessed the performance of voice technology applied to the analysis of French-language television broadcasts speech streams, as a follow-up of the ESTER campaigns, while broadening the range of scientific issues to include spontaneous speech, superimposed speech and diverse content. CRIM was one of 11 French-language laboratories—and the only outside France—to submit systems for text transcription and speaker segmentation tasks as part of ETAPE. This campaign was made possible by the **Association francophone de la Communication parlée (AFCP)**.

CEDROM-SNi

Segmentation of TV broadcast news

CEDROM-SNi contracted CRIM's Speech Recognition Team to split continuous televised news bulletin streams automatically into individual news clips, so they can be indexed like other press clips by **CEDROM-SNi**, the Canadian and French leader in Web-based distribution of press reports.

VoiceTrust

User voice authentication for banking and government systems

VoiceTrust sought CRIM's assistance with its speaker recognition technology and asked us to develop a library for validating audio content. The firm offers a telephone and Web-based speaker identification application. The system begins by ensuring that the voice is indeed that of the client concerned, then checks if the audio recording matches the password.

TalkAlter

Interactive portraits for intergenerational transmission of memory banks

TalkAlter asked CRIM to provide assistance with its technological requirements, applied R&D module (a multi-team project involving voice recognition and indexing, semantic information and an advanced search engine) and facial expression recognition. **TalkAlter** has developed a video platform for collecting, saving and sharing memories by building comprehensive interactive portraits. These portraits allow intergenerational transmission of memory banks in the form of videographic portraits that interact with users through emotion and voice recognition technologies. Partner **Innobec Technologies** is collaborating with CRIM on Web and user interfaces.

→ Distributed Systems Analysis

NECSIS
Optimized implementation of large test suite

NECSIS, the Network on Engineering Complex Software Intensive Systems for Automotive Systems, a five-year project supported by **CRSNG** and **PAC** (Automotive Partnership Canada) and conducted in association with **IBM**, **GM**, **Malina Software**, seven universities and CRIM, has entered its second year. CRIM'S Distributed Systems Analysis Team is focusing on applying a model-based approach to optimizing execution of large test suite.

ScenTest
Test generation

Under a partnership with **Siemens AG** dating to 1999, the Distributed Systems Analysis team is currently employing Model-Based Testing (MBT) principles in test generation. In particular, the team is developing a test generation strategy applicable to concurrent systems based on test scenarios modeled as UML sequence diagrams. An application known as ScenTest that was deployed using this approach supports many functionalities, including test generation based on multiple scenario models and integration into the JUnit text execution framework.

STIMULATING PROJECTS

CRIM will participate in the LEADS research network

CRIM will take part in the Learning Environment Across Disciplines (LEADS) networks, overseen by Professor Susanne Lajoie at **McGill University's** Faculty of Education.

This project is the launch pad for an international partnership aimed at developing "technologically rich" environments. Such environments will enable schools and other educational institutions adopt technological innovations, get students more involved in the learning process and help them to build on their existing knowledge. CRIM's contributions pertain to learning technologies (Sacha Leprêtre), field testing (Claude Chapdelaine) and technological transfer to client settings users (Françoys Labonté).

→ Vision and Imaging

Accès-VD
Video image processing and analysis

The Accès-VD project, funded by the **Office des personnes handicapées du Québec (OPHQ)**, has made it possible to provide experimental video description services to the blind and visually impaired. Over 43 participants throughout Québec listened to 88 DVDs during the seven months of testing and gave the service a remarkable 90% satisfaction rating. Project partners include BAnQ, the INLB, INCA, the RAAQ and seven regional organizations. Claude Chapdelaine, Senior Adviser, presented Accès-VD project results to the 27th Annual International Technology and Persons with Disabilities Conference (CSUN) in San Diego.

Info-Electronics System
Development of radar imaging processor module

Natural Resources Canada asked **Info-Electronics Systems (IES)** to develop a semi-automatic surface water (water body) information update system based on Radarsat-2 imaging. CRIM is acting in this project as subcontractor for development of the radar imaging processor module and as science consultant to **IES**. This project is funded by the **Canadian Space Agency** and **Public Works Canada**.

Dienamex
Development and enhancement of a 3D plotting module using an AutoCad drawing

Dienamex produces extrusion moulds. It wants to minimize the time required to transform its raw 2D CAD into 3D representations that can be loaded into its machining equipment. CRIM's Vision and Imaging Team was asked to select the necessary utility libraries, design a 2D/3D geometry processing application and test the application on the most representative possible data set. Results were extremely positive, since work that once took a **Dienamex** specialist 90 minutes now requires a mere 30 seconds.

Musée du Fjord
Multimedia Project

The Vision and Imaging Team participated in *Voyage au cœur du Fjord*, a multimedia project of great pride to Saguenay-Lac-Saint-Jean's Musée du Fjord. This project was an offshoot of the FREEDNG Stereo-Free 3D Perception of Image-based Rendered Scenes project by Servoing Spectatore Face Pose Motion to Scene Viewpoint. Vision and Imaging was a subcontractor for the museum project developed by **eSpace Web Lab**. A documentary about this work was broadcast April 24, 2012 on TVA.

→ Development and Internet Technologies

ExoTablet and ExoDesk
Multipoint touchscreen

EXOPC developed a ground-breaking multipoint touchscreen that is now part of its ExoTablet and Exodesk lines. This interface provides new, more efficient and more natural ways of using software applications. CRIM will contribute to the development of additional widgets (HTML5 applications) operating in ExoTablet and ExoDesk environments. This tablet may be used at schools in Québec and abroad.

3CE
Semi-automatic commodity coding

This three-year project seeks to develop strategies for automatic analysis of product descriptions using machine learning and natural language processing techniques. The Development and Internet Technologies Team is now working on various subsidiary issues, including identification of a product description's key item and automatically searches synonyms to validate different ways of describing the same product. **3CE** may incorporate these modules in its current process. The **École Polytechnique de Montréal** is a partner of this project funded partly by the **Natural Sciences and Engineering Research Council of Canada (NSERC)**.

Alfresco
Multi-use documentary platform

Alfresco is a comprehensive open-source platform used to manage business content. It is designed to assist companies in advanced deployment and customization of the Alfresco platform as a content or records management system. A customized module was developed for the **Laurentian Agence de la santé et des services sociaux (ASSS)** for document management. This module includes new, leading-edge features to meet the needs of archivists and Québec organizations.

The Solutionneur
Automatic school schedule generation platform

The Solutionneur, an automatic school schedule generation platform, has been offered to all of Québec's school boards for a second year. This solution was jointly developed by CRIM and the **Laval School Board**. More than 70 schools produced their new course schedules using Solutionneur.

TESTING AND INTEROPERABILITY CENTRE (TIC)

A number of major contracts were signed this year, extending the range of services offered by the TIC.

Healthcare: The TIC remains the certification centre for the **Ministère de la Santé et des services sociaux du Québec** (MSSS); its framework agreement with the **DGTI** was renewed for two years. The TIC completed a dozen certification processes this year. Furthermore, its best practices awareness program generated several contracts to assist developers in the healthcare sector.

New! The TIC is signing a framework agreement with the **Ministère des Transports du Québec** (MTQ). The TIC will assist the MTQ in studying various issues pertaining to its IT department, including rollout of a certification process, performance assessment, drafting of criteria for development tenders, load tests and automation proof of concepts.

CRIM was responsible for determining a security process compliance for its client **Analystik**, as an external, neutral and independent auditor, in conjunction with **Kéréon**, our expert partner in IT security.

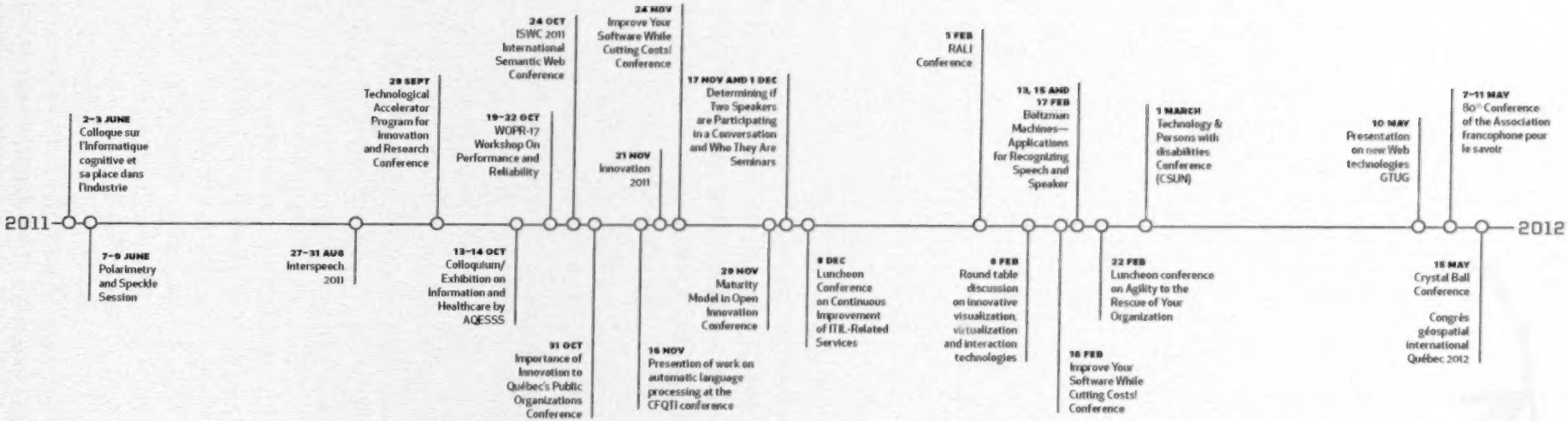
The TIC has conducted an audit and provided an appraisal of development and test procedures that also provides a set of recommendations to the **Groupe Promutuel**.

Moreover, the TIC is offering LaboAgile facilities to **École Polytechnique de Montréal** interns so that they can develop a mobile application in conjunction with the Development and Internet Technologies team, as well as for a semantics project with **Irosoft**.

New clients and other projects: A variety of new clients are using AgileLabs. They include **PCMS**, a small Québec HR software development company and Flejay, for using HP tools in SaaS mode for their projects in Québec and France. **SOGIQUE** is concluding a one-year agreement to use AgileLabs (LaaS) and **Québec International** extended its contract.

CRIM

Conferences and Events


2011
2012
2-3 JUNE
Colloque sur l'informatique cognitive et sa place dans l'industrie
7-9 JUNE
Polarimetry and Speckle Session
27-31 AUG
Interspeech 2011
29 SEPT
Technological Accelerator Program for Innovation and Research Conference
13-14 OCT
Colloquium/ Exhibition on Information and Healthcare by AQESSS
19-22 OCT
WOPR-17 Workshop On Performance and Reliability
24 OCT
ISWC 2011 International Semantic Web Conference
31 OCT
Importance of Innovation to Québec's Public Organizations Conference
24 NOV
Improve Your Software While Cutting Costs! Conference
21 NOV
Innovation 2011
16 NOV
Presention of work on automatic language processing at the CFQTI conference
17 NOV AND 1 DEC
Determining if Two Speakers are Participating in a Conversation and Who They Are Seminars
29 NOV
Maturity Model in Open Innovation Conference
8 DEC
Luncheon Conference on Continuous Improvement of ITIL-Related Services
1 FEB
RALI Conference
8 FEB
Round table discussion on innovative visualization, virtualization and interaction technologies
13, 15 AND 17 FEB
Boltzman Machines—Applications for Recognizing Speech and Speaker
16 FEB
Improve Your Software While Cutting Costs! Conference
22 FEB
Luncheon conference on Agility to the Rescue of Your Organization
1 MARCH
Technology & Persons with disabilities Conference (CSUN)
10 MAY
Presentation on new Web technologies GTUG
15 MAY
Crystal Ball Conference
Congrès géospatial international Québec 2012
7-11 MAY
80th Conference of the Association francophone pour le savoir

SCIENTIFIC CONFERENCES, CONFERENCES, SEMINARS, COLLOQUIA AND WORKSHOPS

CRIM's researchers distinguished themselves throughout the year in all parts of Québec and around the globe.

Langis Gagnon, Lead Researcher of the Vision and Imaging Team, presented an overview of his work on intelligent video surveillance during his Vision and Applied Robotics Conference at the ***80th Conference of the Association francophone pour le savoir*** (ACFAS), from May 7 to 11, 2012.

Samuel Foucher, senior researcher on the Vision and Imaging Team, presented "CRIM's Geospatial Expertise," a scientific conference held May 15, 2012, during the Vitrine Industrielle II of the ***Congrès géospatial international Québec 2012***.

Caroline Barrière, Ph.D., a researcher on the Development and Internet Technologies Team, presented the article she co-authored with Michel Gagnon, Professor at the École Polytechnique de Montréal and Guest Researcher at CRIM, entitled "Drugs and Disorders: from Specialized Resources to Web Data" during the ***International Semantic Web Conference*** (ISWC 2011). The conference was held in Bonn, Germany on October 24, 2012. She also gave this conference at **RALI**, the Université de Montréal's Applied Research in Computational Linguistics Centre, on February 1, 2012.

Claude Chapdelaine, Senior Research Advisor of Vision and Imaging, revealed Accès-VD Project results at the ***27th Annual International Technology and Persons with Disabilities Conference*** (CSUN) on March 1, 2012, in San Diego.

Gilles Boulianne, Pierre Dumouchel and Patrick Kenny attended **Interspeech 2011**—12th Annual Conference of the International Speech Communication Association in Florence, Italy, from August 27 to 31, 2011.

Samuel Foucher, Senior researcher in Vision and Imaging, co-hosted the ***Polarimetry and Speckle*** session at an international workshop organized by the Canadian Space Agency, in Saint-Hubert, from June 7 to 9, 2011.

Pierre Dumouchel, Parisa Darvish, Claude Chapdelaine and Caroline Barrière took part in the ***"Colloque sur l'Informatique cognitive et sa place dans l'industrie"*** organized by the Université du Québec à Montréal and held in Montréal on June 2 and 3, 2011.

Two seminars on ***"Determining if Two Speakers are Participating in a Conversation and Who They Are"*** was given at CRIM on November 17 and December 1, 2011 by Themos Stafylakis, postdoctoral researcher on the Speech Recognition Team.

Patrick Kenny, Lead Researcher of the Speech Recognition Team, gave a conference on ***"Boltzman Machines—Applications for Recognizing Speech and Speaker,"*** at CRIM, on February 13, 15 and 17, 2012.

A conference by Jacques Ouellet on the ***"Maturity Model in Open Innovation"*** was given to Master's Degree students in the class Basics of Technology Transfers, at the Longueuil Campus of the Université Sherbrooke on November 29, 2011.

Caroline Barrière gave a conference in Trois-Rivières on November 16, 2011 presenting her work on **automatic language processing** to members of the Conseil fédéral du Québec en technologie de l'information (CFQTI).

Jacques Ouellet delivered a conference on the ***"Importance of Innovation to Québec's Public Organizations"*** at an October 31, 2011 event hosted by the Centre de leadership et de développement des compétences de Services partagés Québec (CLDC-CSPQ).

On September 28, 2011, CANARIE held a conference in conjunction with CRIM on the ***Technological Accelerator Program for Innovation and Research***.

During the ***Innovation 2011*** event of November 21, Jacques Ouellet participated in the Open Innovation Panel, organized by the Alliance for Commercialization of Canadian Technologies (ACCT).

Raymond Rivest, Senior Advisor and Tests Specialist, led the Bottlenecks and Performance Workshop at ***WOPR-17 (Workshop on Performance and Reliability)*** on October 22, 2011, at HP's Cupertino Executive Center in California. The event brought together some of the world's foremost performance testing specialists.

CRIM had a booth in Québec City on October 13 and 14, 2011 at the **Colloquium/Exhibition on Information and Healthcare** by the Association québécoise d'établissements de santé et de services sociaux (AQESSS).

Organized for the first time by Productions Eventia, the 9th annual ***Crystal Ball Conference*** event was held May 15, 2012 during CONNECT 2012—Digital Affairs Week.

- Nathalie Gosselin, General manager of the Training and Transfer Centre and the Testing and Interoperability Centre presented the conference *"Overview of Critical Issues in Software Testing for Québec."*
- Jacques Ouellet, Senior Vice-President, R&D and Commercialization held a conference entitled *"Smart Data and Big Data: A Quebec Overview."*
- Two trainers associated with CRIM were also present at this event. Éric Lessard, from Kéréon, hosted a security conference, while organizational coach Maurice Bergeron led a conference on Agile Methodology.

CRIM IN ACTION

Open, dynamic and at the heart of the action, CRIM is organizing a range of IT events offering numerous opportunities to network and grow.

CRIM's researchers held a **round table discussion on innovative visualization, virtualization and interaction technologies** for a panel of video gaming, visual effects, animation and simulation experts. This February 8, 2012 event was jointly organized by the Centre NAD, the Consortium en innovation numérique du Québec (CINQ) and CRIM.

A **luncheon conference on *Agility to the Rescue of Your Organization*** was held in Québec City on February 22, 2012, by Maurice Bergeron, SCRUM Master and Specialist in Agile Management.

The Testing and Interoperability Centre hosted the ***"Improve Your Software While Cutting Costs!"*** **conference** in Montréal on November 24, 2011 and Québec City on February 16, 2012 at TechnoConseil. Partners Hewlett Packard Canada and MGA-QA served as guest presenters.

ITIL Expert Yves St-Arnaud hosted a **luncheon conference on *Continuous Improvement of ITIL-Related Services***. The event was held in Québec City on December 8, 2011.

A **presentation on new Web technologies** (HTML5, Dart, GWT, Chrome Apps) was held on May 10, 2012 during the 5th meeting of the Google Technology Users Group **(GTUG)**. The event was co-hosted by Sacha Leprêtre, Director of Development and Internet Technologies Team.

Scientific Publications

REFEREED PUBLICATIONS

Book (1)

Villa, T., Yevtushenko, N., Brayton, R.K., Mishchenko, A., Petrenko, A. and Sangiovanni-Vincentelli, A. (Eds). The Unknown Component Problem, Theory and Applications. Springer, 2012. 311 p.

Book Chapters (1)

Dumouchel, P., Boulianne, G. and Brousseau, J. "Measures for quality of closed-captioning" In Serban, A., Matamala, A., Lavaur, J.-M. (Eds.). Audiovisual translation in close-up: practical and theoretical approaches Bern, Berlin, Brussels, Frankfurt am Main, New York, Oxford, Wien: Peter Lang Publishing Group, 2011. 320 p.

Journals (2)

Ledru, Y., Petrenko, A., Boroday, S. and Mandran, N. "Prioritising Test Cases with String Distances" Automated Software Engineering, 19 (1) 2012 : 65-95.

Simão, A., Petrenko, A. "Generating Asynchronous Test Cases from Test Purposes" Information and Software Technology, 53 (11) 2011: 1252-1262.

Conference, Workshops Proceedings (10)

Cardinal, P., Boulianne, G., and Dumouchel, P. "Using A* for the parallelization of speech recognition systems", Proceedings ICASSP 2012, Tokyo, Japan, March 25-30, 2012.

Povey, D., Hannemann, M., Boulianne, G., Burget, L., Ghoshal, A., Janda, M., Karafiat, M., Kombrink, S., Motlicek, P., Qian, Y., Yanmin Qian, Korbinian Riedhammer, Karel Vesely, Ngoc Thang Vu, "Generating exact lattices in the WFST framework", Proceedings ICASSP 2012.

Petrenko, A., Simão, A. and Yevtushenko, N. "Generating Checking Sequences for Nondeterministic Finite State Machines" In Proceedings of the IEEE Fifth Int. Conference on Software Testing, Verification and Validation (ICST'12). Montréal, Canada, April 18-20, 2012. [The Best Paper Award of the ICST 2012]

Povey, D., Ghoshal, A., Boulianne, G., Burget, L., Glembek, O., Goel, N., Hannemann, M., Motlicek, P., Qian, Y., and Schwarz, P., "The Kaldi Speech Recognition Toolkit", Proceedings ASRU 2011, Hawaii, December 2011.

Alam, J., Kinnunen, T., Kenny, P., Ouellet, P., and O Shaughnessy, D., "Multi-Taper MFCC Features for Speaker Verification Using I-Vectors", Proc. ASRU 2011, Hawaii, December 2011.

Alam, J., Ouellet, P., Kenny, P., O Shaughnessy, D., "Comparative Evaluation of Feature Normalization Techniques for Speaker Verification, Proceedings NOLISP 2011, LNAI 7015, pp. 246-253, Las Palmas, Spain, November 2011.

Alam, J., Kenny, P., O Shaughnessy, D., "A Study of Low-Variance Multi-Taper Features for Distributed Speech Recognition", Proceedings NOLISP 2011, LNAI 7015, pp. 239-245, Las Palmas, Spain, November 2011.

Petrenko, A., Yevtushenko, N. "Adaptive Testing of Deterministic Implementations Specified by Nondeterministic FSMs" In Proceedings of the 23d IFIP Int. Conference on Testing Software and Systems (ICTSS'11), pp. 162-178. Paris, France, November 7-9, 2011. [LNCS 7019]

Barrière C. and Gagnon M. (2011) "Drugs and Disorders: From specialized resources to Web data", WEKEX (Web-Scale Knowledge Extraction Workshop), International Semantic Web Conference, Bonn, Germany, October 2011.

Kenny, P. "Mixture of PLDA Models in i-vector Space for Gender-Independent Speaker Recognition" In Proceedings of Interspeech 2011. Florence, Italy, August 27-31, 2011.

NON-REFEREED PUBLICATIONS

Conference, Workshops Proceedings (3)

Chapdelaine, C. (2012). "Usability of a Specialized Audio-description Player for Visually Impaired Individuals" In the proceedings of *27th Annual International Technology and Persons with disabilities Conference (CSUN)*. San Diego, February 27 – March 3, 2012.

Foucher, S., Lalonde, M., Gagnon, L., "CRIM Notebook Paper - TRECVID 2011 Surveillance Event Detection", In NIST TREC Video Retrieval Evaluation Workshop 2011 (TRECVID 2011). Gaithesburg, MD, December 5-7, 2011.

Foucher, S., Lalonde, M., Gupta, V., Darvish, P., Gagnon, L., Boulianne, G., "CRIM at TRECVID-2011: Content-Based Copy Detection Using Nearest-Neighbor Mapping", In NIST TREC Video Retrieval Evaluation Workshop 2011 (TRECVID 2011). Gaithesburg, MD, December 5-7, 2011.

Technical Reports (2)

St-Charles, P.-L., Gagnon, L. Rapport d'avancement des activités du CRIM sur le projet SPEED-Q pour la période d'avril 2011 à mars 2012. Montréal, CRIM, 2012. 24 p.[CRIM-12/03-02]

Boulianne, G. Reconnaissance vocale pour l'aide à la transcription. Montréal, CRIM, Mai 2011. 17 p. [CRIM-11-09-01]

Poster (1)

Landry, T., Gagnon, L. "The Podium Project" In SPIN Summit 2011 Conference and Exhibit. Toronto, Ontario, Canada, November 8-10, 2011.

Slideshows (6)

Foucher, S., Farage, G. and Bénié, G. B. Speckle Filtering of PolSAR and PolInSAR Images using Trace-based Partial Differential Equations (présentation au colloque "Advanced SAR Workshop" ASAR 2011). Saint-Hubert, CRIM, June 2011. 18 diapositives.

Foucher, S., Farage, G., Charbonneau, F. and Lopez-Martinez, C. The Polarimetric Ratio Filter Applied to PolInSAR Images (présentation au colloque "Advanced SAR Workshop" ASAR 2011). Saint-Hubert, CRIM, June 2011. 22 diapositives.

Chapdelaine, C. L'adaptation de la production et de la diffusion de contenu audio-visuel aux processus cognitifs des personnes aveugles et malvoyantes (présentation au Colloque Informatique cognitive et sa place dans l'industrie IC2011). Montréal, CRIM, juin 2011. 36 diapositives.

Darvish Zadeh Varcheie, P. Détection automatique d'indicateurs faciaux de charge cognitive pour l'analyse des expressions faciales dans le contexte d'un simulateur de conduite automobile (présentation au Colloque « Informatique cognitive et sa place dans l'industrie » IC2011). Montréal, CRIM, juin 2011. 35 diapositives.

Dury, A. Advanced Tools for TCMS Development and Maintenance, Bombardier Transport, Octobre 2011.

Petrenko, A. Presentation of the Testing Project at the NECSIS Workshop, McMaster University, Hamilton, June 2011.

Financial Statements

2011-2012

REVENUES

Applied Research Centre	$2,390,649
Training and Transfer Centre	$979,485
Testing and Interoperability Centre	$247,082
Member dues	$301,405
Rental and sub-rental earnings	$498,338
Master agreement with the MDEIE	$5,705,458
Provincial IT infrastructure grant (PSRv2)	$497,105
Other	$11,051
Total	**$10,630,573**

EXPENSES

Operating expenses

Salaries and benefits	$6,522,553
Training and consulting services	$712,269
Operating expenses	
→ Rent	$1,157,836
→ Advertising and promotion	$88,392
→ Professional administrative services	$435,477
→ Other	$935,282
Amortization of capital assets	$625,568
Total	**$10,477,377**
Excess of revenues over expenses	$153,196

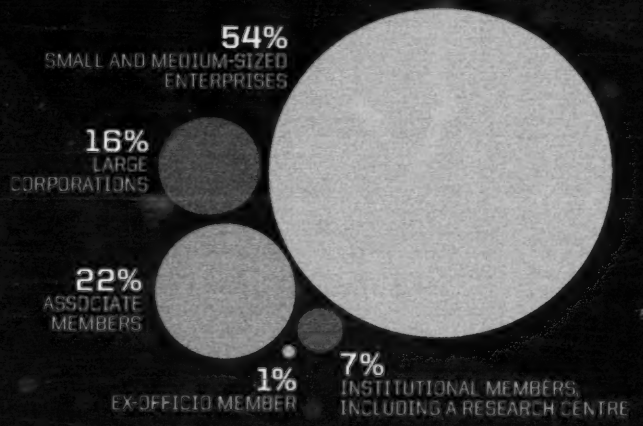
These financial statements cover the period from June 1, 2011 to May 31, 2012

We warmly thank

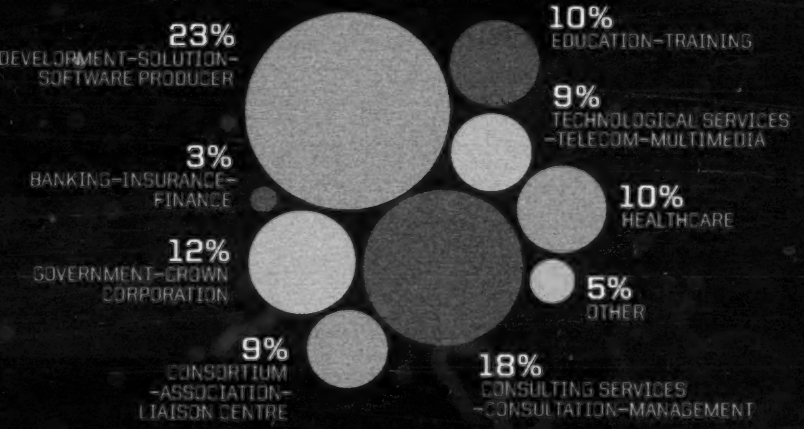
our 161 members

Your extraordinary commitment and loyalty help CRIM take on the future.

MEMBERSHIP BREAKDOWN



SECTORS OF ACTIVITY



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SMALL AND MEDIUM ENTERPRISES

8D Technologies
Abbott Laboratories (Div. Point of Care)
Analystik
AudiSoft Technologies
AU-PC Informatique
Aurora Interactive Ltd. (A)
AXOR Experts-Conseils
Bonjour-santé
Boreal Information Strategies
Brio Conseils
C2 Innovations
Cabinet Conseil en Relations de Travail (A)
CDM Montréal
CEDROM-SNi
CGSI@SOLUTIONS TI
Cogep
Conseils Atelya (A)
Crescendo Systems Corporation
Christie InnoMed
Croesus Finansoft
Datanova Software(A)
Decimal Gouvernance (A)
Dienamex Research in extrusion (A)
Directim (A)
Ecritel (A)
Edilex (A)
Emergensys Solutions (A)
Emergex RS&DE
eSpace W.L. (A)
EXOPC
Famic Technologies
Fédération nationale des enseignantes et des enseignants du Québec (FNEEQ)
Flejay
GCI
Graitec (A)
Groupe LPC (A)
Hotello (Mingus Software)
Humagine
Ideabytes (A)
Info-Electronics Systems
Ingenio, filiale de Loto-Québec
IMAGEM Solutions TI Santé (A)
Informat Software
IngTégration (A)
Irosoft
IT&L@bs Canada
iXmédia
K3 Média
KEOPS Technologies
Leading Boards (A)
Logibec Groupe Informatique
Logiciels Info-Data
Logiciels Radio IP
Lynxid (A)
Mecanica Solutions
MGA-QA (A)
Micro-Systèmes Experts
Nosotech
Nutritek
NVI
OKIOK
Omnitech Labs
Optimum Conseil
Planora
Pretty Objects Computers (A)
Provalis Research(A)
QuadraMed Corporation
Quali-T-Conseil (A)
Real-Time Software Solutions (A)
R3D Consulting
Savoir-faire Linux
SIA Service Information Access
Silex Créations (A)
Soft Informatique
Softvoyage
Solutions Consortech
SOQUIJ
SOVO Technologies
STICORP
Systèmes informatiques CHCA
TalkAlter
TechnoMed Solutions
Ultima Group
Victrix
VoiceTrust eServices Canada (A)
Voxco
Yu centrik (A)

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LARGE CORPORATIONS

Alstom Energy & Transport Canada
Bombardier Transport
CAE (Mirabel Office)
C.S.S.T.
Ericsson Canada
Fujitsu Conseil (Canada)
GFI Solutions
Groupe Promutuel - Systèmes d'information
Groupe TVA
Hewlett-Packard (Canada)
Hydro-Québec
Industrielle Alliance, Insurance and Financial Services
La Capitale Financial Group
National Bank of Canada
National Film Board of Canada
SAP Labs Canada
SAQ - Div. Ressources informationnelles
SITA Canada - Aircraft communications
Société de transport de Montréal (STM)
Société GRICS
Staples Avantage Canada
Ubisoft Divertissements
Ville de Montréal
Ville de Québec
*

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ASSOCIATE MEMBERS

Agence de la santé et des services sociaux de Montréal
Alliance numérique
Association québécoise des informaticiennes et informaticiens indépendants (AQIII)
Association québécoise d'établissements de santé et de services sociaux (AQESSS)
CEFRIO
Centre de services partagés du Québec
Centre NAD
Chambre de commerce française au Canada
CREPUQ
Fédération des cégeps
Fisheries and Oceans Canada
Inno-centre
Investissement Québec
Ministère de la Justice du Québec
Ministère de la Santé et des Services sociaux
Ministère de l'Emploi et de la Solidarité sociale
Ministère des Affaires municipales, Régions et de l'Occupation du territoire
Ministère des Ressources naturelles et de la Faune
Mouvement québécois de la qualité (MQQ)
National Defence
Ordre des ingénieurs du Québec (OIQ)
Pôle universitaire Paul Gérin-Lajoie
Quebec Federal Council in Information Technology
Quebec Photonic Network
Quebec Technology Association
Réseau ACTION TI
Réseau des ingénieurs du Québec
Revenu Québec
RISQ - Réseau d'informations scientifiques du Qc
Sogique
Sous-Traitance Industrielle Québec (STIQ)
TechnoCompétences
Technology Evaluation Centers (TEC)
TechnoMontréal
The French-speaking University Agency (AUF)
Voix des Entrepreneurs en T.I. de Québec (VETIQ)

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INSTITUTIONAL MEMBERS AND RESEARCH CENTRE

Collège Ahuntsic
Concordia University
CRIQ
École de technologie supérieure
École Polytechnique de Montréal
HEC Montréal
McGill University
Université de Montréal
Université de Sherbrooke
Université du Québec à Montréal
Université du Québec à Trois-Rivières
Université Laval

1
EX-OFFICIO MEMBER

Ministère du Développement économique, de l'Innovation et de l'Exportation (MDEIE)

(A) Associate members—small enterprises
* Member who wants to remain anonymous

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Développement économique, Innovation et Exportation
Québec

This report covers CRIM's fiscal year for June 1, 2011 to May 31, 2012.

French version available upon request.

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